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IMPACT OF MUSIC AS MOTIVATION TO PERFORM EXERCISES AMONG UNIVERSITY STUDENTS – A SURVEY

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KEYWORDS

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Physical activity

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BREQ-3

ABSTRACT

The current study aimed to examine the association between music and motivation to do exercise among university students in Nilai, Negeri Sembilan, Malaysia. The demographics data, use of music during exercise, preferred type of music, and criteria to select music were assessed by a validated self-administered questionnaire. The motivation towards exercises was evaluated using the Behavioural Regulations in Exercise Questionnaire (BREQ-3) while the level of physical activity was assessed by Godin-Leisure Time Exercise Questionnaire (LTEQ). The demographics information, use of music during exercise, preferred type of music, and criteria to choose music were tabulated using descriptive statistics. A point-biserial correlation was used to analyze the relationship between music and motivation to do exercise while chi-square was utilized to determine the association between the use of music during exercise and physical activity level. The results of the current study showed that 80.3% of the participants listen to music during exercise. Energetic and rhythmic was the preferred type of music for exercise. Tempo/ speed/ bpm was the most popular factor to be considered during the exercise. Most of the participants prefer to listen to an individual music player during exercise rather than an open audio system.. Listening to music during exercise shown significant correlation with a motivation ($p=0.006$), external regulation ($p=0.014$), identified regulation ($p=0.006$), integrated regulation ($p=0.002$) and intrinsic regulation ($p=0.015$). There was a significant association between the use of music during exercise and physical activity level ($p=0.003$) in this study. Future research that involves the type of exercise performed with the music is encouraged to explore the significance of music as a motivational tool in exercise.

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1 Introduction

Regular exercise has proven to improve physical capacity by enhancing muscular strength and endurance, thereby promotes the development of healthy bones and muscles (Baldari et al., 2010; Rajappan et al., 2015). Regular exercise plays an important role in decreasing the risk of premature mortality and non-communicable conditions such as type-2 diabetes, hypertension, osteoporosis, cancer, and cardiovascular disease (Duncan et al., 2010). Besides, engagement in exercise improves mental health through alleviation of symptoms of psychological discomfort such as anxiety and stress (Baldari et al., 2010; Rajappan et al., 2015).

Physical inactivity is the fourth primary cause of worldwide mortality (Rajappan et al., 2015). According to the report by the Malaysian Adult Nutrition Survey 2003, there was a 39.7% prevalence of physical inactivity and prevalence was higher in females (42.6%) than males (36.7%). World Health Organization (WHO) recommends adults aged 18-64 should perform at least 75 minutes of vigorous-intensity aerobic physical activity or at least 150 minutes of moderate-intensity aerobic physical activity per week to maintain health. However, WHO stated that approximately 60% of the global population do not meet the recommended daily minimum level of physical activity (Rhodes et al., 2017). This rate is concurrent with Malaysia as Malaysian youth claimed their physical activity level reduced after the age of 22 (Salamudin & Harun, 2013).

Music listening habits have been adopted as a strategy to achieve different emotional goals in everyday life (Laukka & Quick, 2013). Studies showed that music helps people to relax, regulate mood, heighten arousal, increase work output and divert attention from unhappy events (Karageorghis & Priest, 2008; Bigliassi et al., 2018). Music has been used during sport-related events to restrain mental and emotional fatigue, sustain motivation and possibly promote athletic performance (Bonnette et al., 2010). The use of music while exercising produces higher than expected levels of strength enhances academic performance for the reason that exercise improves the quality of sleep and reduces insomnia thus indirectly increases endurance, power, and productivity (Karageorghis & Priest, 2012b).

Individuals struggle with motivation to keep exercising regularly despite the well-known benefits of being active. Deficiency of motivation or dullness of exercise is a common cause for discontinuing exercise (Barney et al., 2012). Numerous types of motivation were found to influence intention in continuing exercise and effort to exercise (Duncan et al., 2010). Music as an environmental sensory cue has the potential to convey positive ergogenic and psychological effects across athletic training, widespread exercise or physical activity (Bonnette et al., 2010; Karageorghis & Priest, 2012b; Bigliassi et al., 2018) and even to

overcome the monotony of activities such as jogging (Chamorro-Premuzic & Furnham, 2007). According to previous research, arousal regulation and fatigue dissociation are the fundamental concepts of impacts of music on exercise motivation and performance (Karageorghis & Priest, 2012a). Traditionally, the use of music motivates or inspires people in preparation for a critical event such as the pregame of an important competition (Bonnette et al., 2010). Also, music tends to suppress the awareness of fatigue-related symptoms by diverting the attention toward task-unrelated thoughts during exercise (Bonnette et al., 2010; Chow & Etmier, 2017; Bigliassi et al., 2018). Although many studies have been conducted in assessing the relationship between music and exercise in trained athletes, elderly or diseased population, there is limited research that has addressed the influence of music as a motivation among the current youth generation especially university students consisting of the current youth generation. Therefore, the current study aims to examine the association between music and motivation to do exercise among university students in Nilai, Negeri Sembilan, Malaysia.

2 Materials and Methods

2.1 Subjects

A cross-sectional study was used to determine the association between music and motivation to do exercise among university students in Nilai, Negeri Sembilan, Malaysia. Private universities located in Nilai, Negeri Sembilan, Malaysia were selected using convenient sampling. Electronics self-administered questionnaires were sent to students through e-mail and social media. The inclusion criteria of this study including private university students age from 18-30 years old that understand English in Nilai, Negeri Sembilan, Malaysia. 220 responses were collected but 17 responses were excluded according to exclusion criteria (physical challenge, injury in the last 6 months, auditory impairment, or medical conditions that contraindicated for exercise). The final sample number for this study was 203 (n=203). The response rate was 92.3% among the respondents. Ethical clearance was obtained from the committee board of INTI International University.

2.2 Procedure

A self-validated questionnaire was developed to determine the association between music and motivation to do exercise among university students based on a previous similar study (Hallett & Lamont, 2017). The questionnaire included demographic data and music usage during exercise (type of music, criteria to select music, etc.). Behavioral Regulation in Exercise Questionnaire-version 3 (BREQ-3) was used to assess the exercise motivation of participants as the questionnaire has shown a Cronbach's alpha reliability of more than 0.70 (Markland & Tobin, 2004). Whereas, the Godin-Leisure Time Exercise Questionnaire (LTEQ) for

participants was adopted to self-report their exercise intensity as the questionnaire reports an excellent test-retest reliability ($r=0.86$) (Eisenmann et al., 2002). Permissions were obtained to research private universities around Nilai, Negeri Sembilan, Malaysia. The electronics questionnaire was sent through email and social media. The explanation of the study procedure was informed before the survey and participants were required to submit the informed consent form before proceeding. The survey was terminated for those who selected electronics boxes of exclusion criteria. Data from the questionnaire was collected and analyzed.

2.3 Statistical Analysis

The data obtained from the questionnaire were analyzed using Statistical Package for the Social Sciences (SPSS window version 26.0). Descriptive statistics were used to summarize and report the demographic data as frequency and percentage for each section in the questionnaire. Association between physical activity level and preference of music during exercise were analyzed using Chi-square while the point-biserial correlation was adapted to determine the relationship between music and exercise motivation. The association or correlation is considered statistically significant if the p -value < 0.05 .

3 Results

3.1 Demographics details of the subjects

Table 1 showed the general characteristic of the respondents. In the current study, 35.0% ($n=71$) male and 65.0% ($n=132$) female participated in this study. For the age distribution, most of the participants were in the age group of 18-23 years old (78.3%, $n=129$). Among female participants ($n=132$), 80.3% ($n=106$) listen to music during exercise while 80.3% ($n=57$) of male participants ($n=71$) listen to music during exercise. There is no statistically significant association between gender and the use of music during the exercise session ($p=0.997$). Table 3 shows a detailed preference of the music according to gender.

3.2 Use of music during exercise sessions and preference of music during exercise session according to gender and age

The analysis reported that 80.3% ($n=163$) of participants listen music during exercise and 19.7% ($n=40$) did not listen to music during exercise. The most common reasons for participants not listening to music were to stay focus on the activity (40.0%) followed by choosing to exercises in a quiet environment (30.0%). Table 2 shows the detailed frequency and percentage of not listening to music during exercise.

Both age groups have shown a high percentage of use of music during exercise. However, the association between age and listen to music during exercise is not statistically significant ($p=0.318$).

Table 4 shows a detailed preference of the music according to the age group.

3.3 Importance of music as motivation, preferred type of music and factors influence the choice of music

The participants who listen the music during exercise ($n=163$) were questioned to rate how much music does motivate them during exercise sessions on a 6-point scale (1 = not at all important, 6 = very important).

Those who listen to music during exercise ($n=163$) were analyzed further for the preferred type of music during exercises (multiple responses were possible). Across 163 participants, energetic and rhythmic music ($n=110$, 67.5%) was the most popular to listen to during exercise, followed by upbeat and conventional music ($n=77$, 47.2%). Table 6 shows the details of the preferred type of music during exercise.

The mean importance rating was 5.03 ($SD = 0.965$). Most of the participants responded that music is an important motivation during exercise. Table 5 showed the detailed analysis of the importance of music as motivation during exercise.

Also, criteria for selecting music to exercise (multiple responses were possible) was surveyed among participants who listen to music during exercise ($n=163$). Speed/ tempo/ bpm ($n=102$, 62.6%) are the most important factor when choosing exercise music, followed by rhythm ($n=99$, 60.7%) and mood ($n=93$, 57.1%). The detailed factors were shown in Table 7.

There is a significant negative correlation between motivation and listen to music during exercise ($r=-0.193$, $p=0.006$), between external regulation and listen to exercise music ($r=-0.173$, $p=0.014$), between identified regulation and listen to music ($r=-0.193$, $p=0.006$), between integrated regulation and listen to music during exercise ($r=-0.215$, $p=0.002$). These results indicated that individuals who didn't listen to music during exercise score lower in motivation, external regulation, identified regulation, and integrated regulation.

3.4 Relationship between music and motivation to do exercise

The Behavioural Regulation in Exercise Questionnaire (BREQ-3) was used to determine the motivation for physical activity among participants.

Table 8 shows the results of mean scores for each subscale of BREQ-3 and its relationship with listening to music during exercise. Participants who listen to music ($n=163$) has a higher average score for each subscale when compared to the participants who did not listen to music during exercise ($n=40$).

Table 1 General characteristic of the respondents

Variable	Participants (N)	Percentage (%)
Gender		
Male	71	35.0
Female	132	65.0
Total	203	100.0
Age		
18-23	159	78.3
24-30	44	21.7
Total	203	100.0

Table 2 Reasons of not listening to music during exercise

Reasons	Participants (N)	Percentage (%)
Safety	7	17.5
Wish to focus on the activity	16	40.0
Prefer Quiet	12	30.0
Wanted to connect with the environment	5	12.5

Table 3 Preference of music during exercise session according to gender

Variables	Female		Male		Total	
	Frequency	Percentage (%)	Frequency	Percentage (%)	Frequency	Percentage (%)
Usage of music						
Yes	106	80.3	57	80.3	163	80.3
No	26	19.7	14	19.7	40	19.7

Table 4 Preference of music during exercise session according to age

Variables	Age groups			
	18-23		24-30	
	Frequency	Percentage (%)	Frequency	Percentage (%)
Usage of music				
Yes	130	81.8	33	75.0
No	29	18.2	11	25.0

Table 5 Importance of music as motivation during exercise

Rating	Participants (N)	Percentage (%)
2	2	1.2
3	10	6.1
4	31	19.0
5	58	35.6
6	62	38.0
Total	163	100.0

Table 6 Preferred Type of Exercise Music

Music type	Participants (N)	Percentage (%)
Reflective and Complex (classical, jazz, blues, folk)	31	19.0
Intense and Rebellious (Alternative, rock, heavy metal)	45	27.6
Upbeat and Conventional (Country, pop, religious, soundtracks)	77	47.2
Energetic and Rhythmic (Rap/ hip-hop, soul/funk, electronica/ dance, synchronous running music)	110	67.5
Spoken word (Podcasts and audiobooks)	9	5.5

Table 7 Factors When Choosing Exercise Music

Factor	Participants (N)	Percentage (%)
Speed/ tempo/ bpm	102	62.6
Style/ genre	62	38.0
Memories/ associations	22	13.5
Rhythm	99	60.7
Melody	66	40.5
Mood	93	57.1
Cultural fit	6	3.7

Table 8 Mean motivation scores for each subscale of BREQ-3 and its relationship with listening to music during exercise (p-value)

Subscales of BREQ-3	Mean scores	Listen to music during exercise		r =	p-value
		Yes	No		
Amotivation	2.867	2.928	2.619	-0.193	0.006
External Regulation	1.229	1.300	0.938	-0.173	0.014
Introjected Regulation	2.148	2.221	1.850	-0.131	0.062
Identified Regulation	2.867	2.928	2.619	-0.193	0.006
Integrated Regulation	2.477	2.564	2.119	-0.215	0.002
Intrinsic Regulation	2.883	2.948	2.619	-0.170	0.015

Table 9 Association between LTEQ scores and listen to music during exercise

LTEQ Scores	Listen to music during exercise				p-value
	Yes		No		
	Participants (N)	Percentage (%)	Participants (N)	Percentage (%)	
Active	118	72.4	18	45.0	0.003
Moderately active	35	21.5	15	37.5	
Insufficiently active	10	6.1	7	17.5	
Total	163	100.0	40	100.0	

The average score of intrinsic motivation was highest among the subscales for those who listen to music during exercise and there is a significant negative correlation between intrinsic motivation and listen to exercise music ($r=-0.170$, $p=0.015$). This indicates that the intrinsic motivation score was lower among individuals who didn't listen to music during exercise.

Although there was a negative correlation between introjected regulation and the use of music during exercise ($r=-0.131$), the correlation is not significant ($p=0.062$).

3.5 Association between music and physical activity level

Table 9 shows the association between Godin-Leisure Time Exercise Questionnaire (LTEQ) scores and listening to music during exercise. Across participants who listen to music ($n=163$), 72.4% ($n=118$) of participants are active, 21.5% ($n=35$) are moderately active and 6.1 % ($n=10$) are insufficiently active. Participants who did not listen to music are less active compared to those who listen to music while exercising.

4 Discussion

4.1 Use of music during exercise sessions

In this study, there was a higher percentage of participants who listen to music during exercise compared to those who did not listen to music while exercising. The choice of listening and not listening to music could be explained by the way an individual perceives the experiences of music based on their personality traits and cognitive ability (Chamorro-Premuzic & Furnham, 2007). Besides, the differences in response to music can be explained by an individual's aesthetic judgment, episodic memory, cultural background, or subjective experiences (Juslin, 2013; Clark et al., 2016).

Most of the participants reported that they wish to focus on the activity thereby choose not to listen to music during exercise. Music is reported as a dissociative factor for individuals that want to focus on their breathing and how they feel physically (Razon et al., 2009; Hutchinson & Karageorghis, 2013). Individuals with high training performance perceived music as distract or that have to be avoided (Hallett & Lamont, 2017).

The results of this study showed that females equally listen to music as males. However, other studies suggested women were more favoring to listen to music during exercise compared to men and the result was significant (Priest et al., 2004; Hallett & Lamont, 2017). Both age groups in this study have shown a higher percentage of listening to music while exercising. Younger individuals (<26 years old) feel more motivated and stimulated with music during exercise compared to older adults (>46 years old) (Priest et al., 2004).

Across participants who did not listen to music during exercise ($n=40$), 45.0% ($n=18$), 37.5% ($n=15$) are moderately active and 17.5% ($n=7$) are insufficiently active. There is a significant association between physical activity level (LTEQ) and listen to music during exercise ($p=0.003$).

Participants generally believed music plays an important role in motivation to do exercise as the mean importance rating of music was 5.03 on a 6-point scale. This result was in line with a previous study where participants reported a high mean importance rating (4.42) of music in sports and exercise (Laukka & Quick, 2013). According to the same study that surveyed emotional use of music in sports and exercise, participants reported intentions for listening to music during exercise including enhancing motivation, positive effect, endurance, and flow to make training more pleasurable and efficient (Edworthy & Waring, 2006).

Energetic and rhythmic was the most preferred type of music to listen during exercise among university students followed by upbeat and conventional and intense and rebellious. This result was similar to another study that concluded hip hop, rock, pop, and country music were popular types of music to listen to during exercise among college students (Barney et al., 2012). Besides, prioritization of speed/ tempo/bpm when selecting music as exercise motivation showed a high percentage in the current study whereby tempo of a song shown to improve the physical level during exercise (Edworthy & Waring, 2006; Waterhouse et al., 2010; Hallett & Lamont, 2017).

4.2 Relationship between music and motivation to do exercise

BREQ-3 has been adopted in the current study to determine the level of motivation to perform the exercise. The questionnaire consists of few components such as motivation, external regulation, introjected regulation, identified regulation, integrated regulation, and intrinsic regulation. The results of this study showed that each subscale of motivation component was higher among participants who exercised with the presence of music compared to those who did not listen to music while exercising.

There was a significant negative correlation between integrated regulation and exercise with music. This denotes the importance of music in improving the integrated regulation of university students during exercise. Integrated regulation was referred to as the behavior of an individual which represents their identity and personal values (Ryan & Deci, 2000) and plays as a key contributor for exercise frequency and duration among regular exercisers (Duncan et al., 2010). Identified regulation represents commitment in the behavior that is individually important and outcomes of the behavior appreciated by the individual (Ryan & Deci, 2000). Identified regulation has been shown to contribute to the increase in exercise frequency (Duncan et al., 2010). In this

study, there was a significant negative correlation between the use of music during exercise and identified regulation. Thus, individuals that listened to music while exercising are more likely to engage in exercise as identified regulation was higher.

The average score of intrinsic regulation of participants who listened to music during exercise was highest among all subscales. Intrinsic motivation is derived from individual satisfaction or interest that doesn't get affected by an external factor such as rewards (Duncan et al., 2010; Maloney, 2013). A significant negative correlation between intrinsic regulation and listen to music during exercise was found in the current study. Similarly, another study reported higher intrinsic motivation was associated with a higher frequency of exercise among university students (Li, 1999).

Motivation refers to when a person participates in behavior without any intention to perform it while extrinsic motivation comes from an external factor influenced by an outcome (Maloney, 2013). In this study, both external regulation and motivation were higher in those who listened to music during exercise and there is a significant correlation between listening to music during exercise and external regulation and between the use of music during exercise and motivation. Thus, music has been shown to influence an individual to perform the exercise while acting as an adjunct motivating tool. Introjected regulation is the longing to prevent self-imposed punishments or to accomplish intrapersonal achievements (Ryan & Deci, 2000). There was a significant influence of introjected regulation in improving exercise intensity (Edmunds et al., 2006). However, the result of this study shown there was no significant correlation between the use of music during exercise and introjected motivation.

Motivational music was recognized as music that controls arousal, decreases perceptions of exertion and enhances mood (Karageorghis & Priest, 2012a). Music can be used for the management of ideal arousal as well as the positive effect that is important for motivation and performance in sports (Hanin, 2007). Thus, motivational music can improve positive emotion thereby enhance psychological states even at a high intensity of exercise and indirectly, develop exercise adherence (Hanin, 2007). Theoretically, motivational stimuli such as music and video serve to decrease the harmful effects of fatigue on the efferent control of working muscles by readjusting electrical activity in the brain (Bigliassi et al., 2016). The findings of cerebral effects of music during exercise revealed that music altered attention toward unrelated thoughts and enhanced affective arousal thus reducing fatigue-associated symptoms and exercise perception (Bigliassi et al., 2018). Thus, music can be used as a prime tool to increase the level of motivation among students which indirectly enhances the performance, adherence, and mood towards exercise.

4.3 Association between music and physical activity level

Most of the participants who listened to music during exercise were categorized to be active (72.4%). The results of this study also showed there was a significant association between physical activity and the use of music during exercise. Motivational use of music during exercise improves commitment to exercise (Karageorghis & Priest, 2012a). Lowering perceptions of exertion is the crucial role of music in recreational exercise to increase the amount of effort performed by minimizing the negative feeling usually connected with high-intensity exercise (Karageorghis & Priest, 2008). Awareness of fatigue while exercising reduced with aid of music thereby provides a more enjoyable experience. Music has been proved to distract perceived exertion during physical activity thereby encourage a more pleasant experience of exercise (Bonnette et al., 2010). In a study that compared exercising in the presence of music, without music and noise situation, a significant improvement was seen in the heart rate, amount of work done and time spent exercising among participants who exercise with music (Thornby et al., 1995). Music enhances the positive feeling of exercise thus improves exercise adherence leads to an increased level of physical activity among those listening to music during exercise.

Secondly, music has proved to exert recuperative effects on health that fasten recovery from training, competition, or injury (Terry & Karageorghis, 2011). In a study that investigates the effects of music listening after stressful tasks among college students, there were significant improvements in neuroendocrine responses, immune function, and emotional states (Hirokawa & Ohira, 2003). When post-exercise fatigue was improved with the use of music during exercise, people are more likely to engage in the next exercise session thus improve overall physical activity level.

There are few limitations in this study such as the type of exercise performed by the participants was not included in this study as some of the exercises such as swimming is difficult to perform with music. In terms of sample collection, a smaller sample size of this study may misrepresent the study population.

Moreover, less response from male compared to female participants may affect the reliability of the study. Future studies may consider the type of exercise performed by the participants, larger sample size, and equal gender representation of the study population.

Conclusion

The current study explored the association of music as a motivation to perform exercise among university students. The result revealed that music can be a useful tool in maintaining the motivation level among students to engage in physical exercises.

Energetic and rhythmic music is the most popular music for exercise among university students while the most important criteria for choosing music to exercise was tempo/ bpm/ speed. Regular participation in exercises has shown to maintain good health, regulate mood, increase productivity, restrain mental and health emotion as well as improve sleep quality.

In summary, commitment to regular exercise encouraged by the use of music reduces the physical inactivity of university students as the motivational level were higher compared to those who don't listen to music.

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